

What is claimed is:

[c1] 1. The apparatus aspect of this invention provides a guidance system for the boring head of a micro-tunnelling machine of the type which bores in a selected direction and inclination using laser beam guidance having the endmost part of the drive to the boring bit adjustable in two directions at 90° wherein, the endmost part of the drive has a target for the laser beam, means to convey an image of the target and the laser strike position thereon to an operator situated remotely from the boring head and input means for the operator to adjust the direction of the endmost part of the drive.

[c2] 2. A guidance system as claimed in Claim 1, wherein the means to convey the image is a video camera.

[c3] 3. A guidance system as claimed in Claim 2, wherein the target is a surface against which the laser is visible in contrast.

[c4] 4. A guidance system as claimed in Claim 3, wherein the target has markings to help the operator to centre the direction of the boring bit.

[c5] 5. A guidance system as claimed in Claim 1, wherein the input means for the operator comprises switches for controlling adjusters which act on the drive shaft.

[c6] 6. A guidance system as claimed in Claim 5, wherein the switches are grouped for joystick operation.

[c7] 7. A guidance system as claimed in Claim 5, wherein the adjusters are a pair of rams mutually disposed at an angle and connectable to a source of water pressure and to a water drain.

[c8] 8. A guidance system as claimed in Claim 7, wherein the ram has a water in port and a water out port and ram movement is initiated by connection of the out port to drain.

[c9] 9. A guidance system as claimed in Claim 8, wherein a check valve between the water source and the in port of the ram maintains prevailing pressure.

[c10] 10. A guidance system as claimed in Claim 1, wherein the boring head is 200-800mm in diameter.

[c11] 11. A guidance system as claimed in Claim 1, wherein the bore rate is 9-95 ft/hr.

[c12] 12. A guidance system as claimed in Claim 5, wherein the input means includes input signals from an imaging system which uses the camera image to compare the bore direction indicated by the target with the laser beam direction and operates switches until the operator assumes manual control.